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Research Triangle Park NC 27711

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December 1980

Air



# Northeast Corridor Regional Modeling Project - Determination Of Organic Species Profiles For Gasoline Liquids And Vapors

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ORIGINAL

# **Northeast Corridor Regional Modeling Project - Determination Of Organic Species Profiles For Gasoline Liquids And Vapors**

by

Midwest Research Institute  
425 Volker Boulevard  
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Contract No. 68-02-2524

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Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY  
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Office of Air Quality Planning and Standards  
Research Triangle Park, North Carolina 27711

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## SECTION 1

### INTRODUCTION

The Office of Air Quality Planning and Standards (OAQPS) is undertaking a large program to validate and demonstrate photochemical oxidant diffusion models. The program will include the application of a Regional model to the Northeast Corridor of the United States, and the application of the SAI Urban Airshed Model to five metropolitan areas (Boston, New York, Philadelphia, Baltimore, and Washington, DC) in the northeastern United States, respectively. This report presents the results of a study to determine organic species profiles for gasoline liquids and vapors for 20 samples of gasoline(s) collected from the five metropolitan areas. The purposes of this study were (1) to determine organic species profiles for gasoline vapors for use in photochemical modeling applications, (2) to compare organic species profiles for gasoline vapors to organic species profiles of gasoline liquids, and (3) to determine the effect of temperature on gasoline vapor speciation.

The sampling was conducted by Midwest Research Institute (MRI) personnel during the period July 14 to July 18, 1980. The sample analysis was conducted by Department of Energy (DOE), Bartlesville, Oklahoma. For each of the 20 samples, both the liquid organic species profile and the vapor organic species profile at an equilibrium temperature of 80°F (27°C) were determined by gas chromatography (GC) analysis. The Exxon regular leaded and Exxon regular unleaded Philadelphia samples were also analyzed for vapor organic species at an equilibrium temperature of 60°F (16°C), 100°F (38°C), and 120°F (49°C).

## SECTION 2

### SAMPLING PROCEDURES

One-quart metal containers with inner seals to protect against leakage were selected to contain and store the samples. A brass nozzle adaptor was made to allow the leaded gasoline samples to be filled directly into the cans.

Due to fire regulations the sample cans were painted red and stenciled "GASOLINE" on their exteriors. Adhesive labels were affixed showing address, date, type of gasoline, and signature of the sampler. The sampling techniques were tested in the Kansas City area prior to sample gathering. Wherever possible the fire marshall or other responsible person in each locality was contacted prior to beginning the sampling trip to ensure that local regulations and the sampling program were not in conflict.

Each sample container was filled with the specified grade of gasoline at a filling station within the city limits as shown in Table 1. The containers were filled to 90% of capacity and inner seals installed. The delivery hose was flushed with a minimum of 1 gal. of gasoline prior to sample collection. After collection the samples were stored in a metal insulated chest until delivered for analysis. Dry ice was added to the insulated chest as needed to prevent excessive temperatures.

No sampling problems were encountered. Sample cans proved to keep the samples from leaking. Samples were transported by car to DOE, Bartlesville, Oklahoma. The samples were kept in cold (0°F) storage at DOE prior to analysis.

TABLE 1. SAMPLING MATRIX

| City             | Brand of gasoline                     |                                                      |                     |
|------------------|---------------------------------------|------------------------------------------------------|---------------------|
|                  | Leaded<br>regular                     | Unleaded<br>regular                                  | Unleaded<br>premium |
| Boston           | (2) Mobil<br>(3) Texaco               | (4) Mobil<br>(5) Texaco                              | (6) Shell           |
| New York         | (7) Mobil                             | (8) Mobil                                            | (9) Mobil           |
| Philadelphia     | (10) Arco<br>(11) Exxon <sup>a/</sup> | (12) Arco<br>(13) Exxon <sup>a/</sup><br>(14) Sunoco | (15) Amoco          |
| Baltimore        | (16) Exxon                            | (17) Exxon                                           | (18) Shell          |
| Washington, D.C. | (19) Amoco                            | (20) Amoco                                           | (21) Amoco          |

Note: Numbers in parentheses indicate the corresponding summary table.

<sup>a/</sup> Vapor analysis performed at four temperatures.

### SECTION 3

#### ANALYSIS PROCEDURES

The analysis procedures were established by Dr. Frank Cox of DOE. The samples were analyzed on a Perkin-Elmer Gas Chromatograph, Model 900 with flame ionization detector. The column used was a 200 ft squalane (0.01 mm I.D. stainless steel) with helium carrier and nitrogen make-up gases. The chromatograph was calibrated daily with a blend of propane, isobutane, isobutene, and n-butane. The data were collected with a Hewlett Packard 3353-A Laboratory Automation System and monitored with a strip recorder. The collected data were then processed by a Hewlett Packard 2100 computer system.

The bulk liquids were analyzed by direct syringe injection of a chilled (0°F) sample into the GC column. A more complex method, described below, was needed to determine organic species profiles for gasoline vapors.

A 250 cc glass, round-bottom flask fitted with side arm (for evacuating) and top with rubber septum (total volume = 333 cc) was rinsed with a 50:50 mixture of acetone/petroleum ether, flushed with nitrogen and evacuated to hard vacuum (halocarbon grease used for ground glass joints). A syringe loaded with 22 cc's of liquid sample was injected through the rubber septum creating a 1:15 liquid to vapor ratio. The flask was encased in a heating mantle or placed in a controlled temperature environment, brought to desired temperature, and allowed to equilibrate for 2 hr. Using a hypodermic needle, air was introduced into the flask through the rubber septum, reducing the vacuum to about 6 cm. The flask was then allowed to equilibrate at the desired temperature for 1 hr. The flask was then brought to atmospheric pressure with a hypodermic needle passed through the rubber septum. A 4 cc vapor sample was drawn from the flask and injected into a 32 liter Tedlar bag simultaneously with 8 liters of air. A 25 cc vapor sample from the Tedlar bag was injected onto the column and held for 5 min at -130°C. The oven temperature was then raised to -10°C and was programmed to rise at 2.5°C/minute until 100°C was reached. The oven temperature was held for 30 min at 100°C.

## SECTION 4

### RESULTS

The analysis printouts (see the Appendix)<sup>a</sup> were used by MRI to produce tables of volume and weight percent of hydrocarbons by carbon number and by chemical class. These results appear in Tables 2 through 21. No acetylenes were detected and only one sample (Table 10) showed an apparent oxygenated compound.

Tables 2 through 21 were derived from the analysis printouts by use of the equations shown below:

liquid vol % = vol fraction x 100  
liquid wt % = mole fraction x 100 x molecular wt - results normalized to 100  
vapor vol % = mole fraction x 100  
vapor wt % = mole fraction x 100 x molecular wt - results normalized to 100

The molecular weights used are shown in Table 22. The oxygenates were assumed to be alcohols. Since the only oxygenate found is believed to be acetaldehyde, the C<sub>2</sub> molecular weight for oxygenates was changed to that for acetaldehyde.

<sup>a</sup> Sampling and Analysis Data Sheets, the appendix to this report, is available as a separate publication (EPA-450/4-80-036b).

## SECTION 5

### CONCLUSIONS

The results indicate that organic species profiles of gasoline vapors differ significantly from organic species profiles of gasoline liquids. The range into which the 20 gasoline liquid and vapor species profiles fall is given below.

| <u>Reactivity<br/>Class</u> | <u>Liquid<br/>(wt. %)</u> | <u>Vapor<br/>(wt. %)</u> |
|-----------------------------|---------------------------|--------------------------|
| Aromatic                    | 28-52                     | 0.8-3.2                  |
| Olefin                      | 0-12                      | 0-22                     |
| Paraffin                    | 37-67                     | 76-98                    |

The vapor profiles show only a small percentage of aromatics due to the low volatility of aromatics. Conversely, the vapor profiles show a high percentage of paraffins due to the high volatility of C<sub>4</sub> and C<sub>5</sub> paraffins. There is also an increase in the percentage of olefins in the vapor profiles due to the high volatility of C<sub>4</sub> and C<sub>5</sub> olefins.

The two samples measured at varying vapor temperatures (Tables 11a and 13a) show only minor changes in composition with temperature, but the total hydrocarbon concentration increases substantially with temperature.

# BEST DOCUMENT AVAILABLE

TABLE 2. BOSTON, MASSACHUSETTS, MOBIL LEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |        | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.14      | 0.00    | 0.00      | 0.14   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 7.08      | 1.05    | 0.00      | 8.13   | 4              | 46.96     | 4.03    | 0.00      | 50.99  |
| 5              | 15.63     | 2.57    | 0.00      | 18.20  | 5              | 32.95     | 3.55    | 0.00      | 36.50  |
| 6              | 17.43     | 1.74    | 1.24      | 20.41  | 6              | 9.93      | 0.31    | 0.25      | 10.49  |
| 7              | 10.24     | 0.73    | 4.42      | 15.39  | 7              | 1.38      | 0.00    | 0.38      | 1.76   |
| 8              | 10.78     | 0.04    | 6.22      | 17.04  | 8              | 0.23      | 0.00    | 0.03      | 0.26   |
| 9              | 4.47      | 0.12    | 6.67      | 11.26  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.16      | 0.00    | 5.41      | 7.57   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.55      | 0.00    | 0.66      | 1.21   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.58      | 0.00    | 0.08      | 0.66   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 69.06     | 6.25    | 24.70     | 100.01 | TOTAL          | 91.45     | 7.89    | 0.66      | 100.00 |

  

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.10      | 0.00    | 0.00      | 0.10   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 5.66      | 0.88    | 0.00      | 6.55   | 4              | 40.82     | 3.38    | 0.00      | 44.20  |
| 5              | 13.61     | 2.35    | 0.00      | 15.96  | 5              | 35.56     | 3.72    | 0.00      | 39.28  |
| 6              | 16.23     | 1.70    | 1.51      | 19.44  | 6              | 12.80     | 0.39    | 0.29      | 13.48  |
| 7              | 10.13     | 0.72    | 5.31      | 16.16  | 7              | 2.07      | 0.00    | 0.52      | 2.59   |
| 8              | 10.68     | 0.04    | 7.47      | 18.18  | 8              | 0.39      | 0.00    | 0.05      | 0.44   |
| 9              | 4.46      | 0.11    | 8.02      | 12.59  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.21      | 0.00    | 6.78      | 8.99   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.56      | 0.00    | 0.78      | 1.34   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.61      | 0.00    | 0.09      | 0.69   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 64.25     | 5.80    | 29.95     | 100.00 | TOTAL          | 91.64     | 7.50    | 0.86      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,470 ppm C total)

# BEST DOCUMENT AVAILABLE

TABLE 3. BOSTON, MASSACHUSETTS, TEXACO LEADED REGULAR

| CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |       |        | CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |      |        |
|----------------------------------------------|-------|------|-------|--------|----------------------------------------------|-------|------|------|--------|
| VOLUME PERCENT                               |       |      |       |        | VOLUME PERCENT                               |       |      |      |        |
| 1                                            | 0.00  | 0.00 | 0.00  | 0.00   | 1                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 2                                            | 0.00  | 0.00 | 0.00  | 0.00   | 2                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 3                                            | 0.08  | 0.00 | 0.00  | 0.08   | 3                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 4                                            | 4.02  | 1.13 | 0.00  | 5.15   | 4                                            | 33.37 | 5.49 | 0.00 | 38.86  |
| 5                                            | 17.73 | 2.34 | 0.00  | 20.07  | 5                                            | 41.25 | 3.43 | 0.00 | 44.68  |
| 6                                            | 21.00 | 0.99 | 0.98  | 22.97  | 6                                            | 13.22 | 0.32 | 0.27 | 13.81  |
| 7                                            | 12.13 | 0.76 | 3.33  | 16.22  | 7                                            | 1.92  | 0.00 | 0.40 | 2.32   |
| 8                                            | 9.64  | 0.03 | 7.99  | 17.66  | 8                                            | 0.25  | 0.00 | 0.10 | 0.35   |
| 9                                            | 4.77  | 0.07 | 7.10  | 11.94  | 9                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 10                                           | 1.75  | 0.00 | 3.39  | 5.14   | 10                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 11                                           | 0.43  | 0.00 | 0.36  | 0.79   | 11                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 12                                           | 0.00  | 0.00 | 0.00  | 0.00   | 12                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| TOTAL                                        | 71.55 | 5.32 | 23.15 | 100.02 | TOTAL                                        | 90.01 | 9.24 | 0.77 | 100.02 |

  

| CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |       |        | CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |      |        |
|----------------------------------------------|-------|------|-------|--------|----------------------------------------------|-------|------|------|--------|
| WEIGHT PERCENT                               |       |      |       |        | WEIGHT PERCENT                               |       |      |      |        |
| 1                                            | 0.00  | 0.00 | 0.00  | 0.00   | 1                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 2                                            | 0.00  | 0.00 | 0.00  | 0.00   | 2                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 3                                            | 0.05  | 0.00 | 0.00  | 0.05   | 3                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 4                                            | 3.22  | 0.96 | 0.00  | 4.17   | 4                                            | 28.03 | 4.45 | 0.00 | 32.48  |
| 5                                            | 15.51 | 2.16 | 0.00  | 17.66  | 5                                            | 43.01 | 3.48 | 0.00 | 46.48  |
| 6                                            | 19.54 | 0.99 | 1.20  | 21.72  | 6                                            | 16.46 | 0.39 | 0.30 | 17.16  |
| 7                                            | 12.10 | 0.74 | 4.02  | 16.86  | 7                                            | 2.78  | 0.00 | 0.53 | 3.31   |
| 8                                            | 9.55  | 0.04 | 9.65  | 19.23  | 8                                            | 0.41  | 0.00 | 0.15 | 0.57   |
| 9                                            | 4.79  | 0.07 | 8.57  | 13.43  | 9                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 10                                           | 1.80  | 0.00 | 4.20  | 6.00   | 10                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 11                                           | 0.44  | 0.00 | 0.43  | 0.87   | 11                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 12                                           | 0.00  | 0.00 | 0.00  | 0.00   | 12                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| TOTAL                                        | 66.99 | 4.95 | 28.06 | 100.00 | TOTAL                                        | 90.69 | 8.32 | 0.99 | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,380 ppm C total)

# BEST DOCUMENT AVAILABLE

TABLE 4. BOSTON, MASSACHUSETTS, MOBIL UNLEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|-------|
| VOLUME PERCENT |           |         |           |        | VOLUME PERCENT |           |         |           |       |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00  |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00  |
| 3              | 0.23      | 0.00    | 0.00      | 0.23   | 3              | 2.95      | 0.00    | 0.00      | 2.95  |
| 4              | 6.53      | 1.23    | 0.00      | 7.76   | 4              | 45.71     | 4.57    | 0.00      | 50.28 |
| 5              | 14.65     | 3.32    | 0.00      | 17.97  | 5              | 33.14     | 4.90    | 0.00      | 38.04 |
| 6              | 11.56     | 2.32    | 1.38      | 15.26  | 6              | 6.09      | 0.51    | 0.33      | 6.93  |
| 7              | 8.66      | 1.18    | 6.00      | 15.84  | 7              | 1.17      | 0.00    | 0.47      | 1.64  |
| 8              | 10.03     | 0.04    | 10.32     | 20.39  | 8              | 0.15      | 0.00    | 0.00      | 0.15  |
| 9              | 4.02      | 0.10    | 10.58     | 14.70  | 9              | 0.00      | 0.00    | 0.00      | 0.00  |
| 10             | 1.49      | 0.00    | 5.33      | 6.82   | 10             | 0.00      | 0.00    | 0.00      | 0.00  |
| 11             | 0.28      | 0.00    | 0.40      | 0.68   | 11             | 0.00      | 0.00    | 0.00      | 0.00  |
| 12             | 0.37      | 0.00    | 0.00      | 0.37   | 12             | 0.00      | 0.00    | 0.00      | 0.00  |
| TOTAL          | 57.82     | 8.19    | 34.01     | 100.02 | TOTAL          | 89.21     | 9.98    | 0.80      | 99.99 |

  

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.15      | 0.00    | 0.00      | 0.15   | 3              | 1.99      | 0.00    | 0.00      | 1.99   |
| 4              | 5.12      | 1.02    | 0.00      | 6.14   | 4              | 40.56     | 3.92    | 0.00      | 44.48  |
| 5              | 12.41     | 2.97    | 0.00      | 15.38  | 5              | 36.51     | 5.25    | 0.00      | 41.76  |
| 6              | 10.55     | 2.21    | 1.65      | 14.41  | 6              | 8.01      | 0.66    | 0.39      | 9.06   |
| 7              | 8.44      | 1.13    | 7.04      | 16.61  | 7              | 1.79      | 0.00    | 0.66      | 2.45   |
| 8              | 9.72      | 0.04    | 12.12     | 21.87  | 8              | 0.26      | 0.00    | 0.00      | 0.26   |
| 9              | 3.92      | 0.09    | 12.45     | 16.46  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 1.49      | 0.00    | 6.36      | 7.85   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.28      | 0.00    | 0.46      | 0.74   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.38      | 0.00    | 0.00      | 0.38   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 52.47     | 7.46    | 40.08     | 100.00 | TOTAL          | 89.13     | 9.82    | 1.06      | 100.00 |

BULK LIQUID

SATURATED VAPOR @80 DEGREES F.  
(1,440 ppm C total)

# BEST DOCUMENT AVAILABLE

TABLE 5. BOSTON, MASSACHUSETTS, TEXACO UNLEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|-------|
| VOLUME PERCENT |           |         |           |        | VOLUME PERCENT |           |         |           |       |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00  |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00  |
| 3              | 0.06      | 0.00    | 0.00      | 0.06   | 3              | 0.00      | 0.00    | 0.00      | 0.00  |
| 4              | 6.72      | 1.24    | 0.00      | 7.96   | 4              | 48.71     | 4.92    | 0.00      | 53.63 |
| 5              | 12.89     | 3.63    | 0.00      | 16.52  | 5              | 30.96     | 4.74    | 0.00      | 35.70 |
| 6              | 9.93      | 2.33    | 0.00      | 12.26  | 6              | 6.21      | 0.66    | 0.22      | 7.09  |
| 7              | 11.35     | 1.34    | 4.86      | 17.55  | 7              | 1.87      | 0.03    | 0.53      | 2.43  |
| 8              | 16.75     | 0.04    | 7.55      | 24.34  | 8              | 1.03      | 0.00    | 0.11      | 1.14  |
| 9              | 4.61      | 0.19    | 7.79      | 12.59  | 9              | 0.00      | 0.00    | 0.00      | 0.00  |
| 10             | 2.08      | 0.00    | 5.01      | 7.09   | 10             | 0.00      | 0.00    | 0.00      | 0.00  |
| 11             | 0.32      | 0.00    | 0.54      | 0.86   | 11             | 0.00      | 0.00    | 0.00      | 0.00  |
| 12             | 0.77      | 0.00    | 0.00      | 0.77   | 12             | 0.00      | 0.00    | 0.00      | 0.00  |
| TOTAL          | 65.48     | 8.77    | 25.75     | 100.00 | TOTAL          | 88.78     | 10.35   | 0.86      | 99.99 |

  

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.04      | 0.00    | 0.00      | 0.04   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 5.36      | 1.04    | 0.00      | 6.40   | 4              | 42.57     | 4.15    | 0.00      | 46.73  |
| 5              | 11.14     | 3.31    | 0.00      | 14.45  | 5              | 33.59     | 5.00    | 0.00      | 38.59  |
| 6              | 9.21      | 2.27    | 0.00      | 11.48  | 6              | 8.05      | 0.84    | 0.26      | 9.14   |
| 7              | 10.83     | 1.30    | 5.82      | 17.94  | 7              | 2.82      | 0.04    | 0.73      | 3.60   |
| 8              | 16.49     | 0.04    | 9.04      | 25.57  | 8              | 1.77      | 0.00    | 0.18      | 1.95   |
| 9              | 4.58      | 0.19    | 9.35      | 14.12  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.13      | 0.00    | 6.13      | 8.27   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.33      | 0.00    | 0.64      | 0.96   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.79      | 0.00    | 0.00      | 0.79   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 60.90     | 8.13    | 30.97     | 100.00 | TOTAL          | 88.80     | 10.03   | 1.17      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,470 ppm C total)

# BEST DOCUMENT AVAILABLE

TABLE 6. BOSTON, MASSACHUSETTS, SHELL UNLEADED PREMIUM

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |        | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.07      | 0.00    | 0.00      | 0.07   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 5.00      | 2.01    | 0.00      | 7.01   | 4              | 38.50     | 14.41   | 0.00      | 52.91  |
| 5              | 9.72      | 4.92    | 0.00      | 14.64  | 5              | 29.89     | 5.48    | 0.00      | 35.37  |
| 6              | 7.96      | 4.24    | 0.00      | 12.20  | 6              | 4.89      | 2.75    | 0.18      | 7.82   |
| 7              | 7.35      | 0.57    | 15.18     | 23.10  | 7              | 1.12      | 0.00    | 1.68      | 2.80   |
| 8              | 16.52     | 0.02    | 8.57      | 25.11  | 8              | 0.99      | 0.00    | 0.11      | 1.10   |
| 9              | 4.02      | 0.00    | 7.10      | 11.12  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 1.79      | 0.00    | 4.44      | 6.23   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.14      | 0.00    | 0.38      | 0.52   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.00      | 0.00   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 52.57     | 11.76   | 35.67     | 100.00 | TOTAL          | 75.39     | 22.64   | 1.97      | 100.00 |

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.05      | 0.00    | 0.00      | 0.05   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 3.85      | 1.64    | 0.00      | 5.49   | 4              | 33.67     | 12.17   | 0.00      | 45.84  |
| 5              | 8.21      | 4.45    | 0.00      | 12.66  | 5              | 32.45     | 5.78    | 0.00      | 38.23  |
| 6              | 7.20      | 3.87    | 0.00      | 11.07  | 6              | 6.34      | 3.48    | 0.21      | 10.04  |
| 7              | 6.86      | 0.54    | 17.68     | 25.08  | 7              | 1.69      | 0.00    | 2.33      | 4.02   |
| 8              | 15.76     | 0.02    | 9.99      | 25.78  | 8              | 1.70      | 0.00    | 0.18      | 1.88   |
| 9              | 3.90      | 0.00    | 8.32      | 12.23  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 1.77      | 0.00    | 5.28      | 7.05   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.15      | 0.00    | 0.44      | 0.59   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.00      | 0.00   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 47.77     | 10.52   | 41.71     | 100.00 | TOTAL          | 75.85     | 21.43   | 2.72      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,020 ppm C total)

# BEST DOCUMENT AVAILABLE

TABLE 7. NEW YORK, NEW YORK, MOBIL LEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |        | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.12      | 0.00    | 0.00      | 0.12   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 6.14      | 1.02    | 0.00      | 7.16   | 4              | 45.06     | 4.11    | 0.00      | 49.17  |
| 5              | 9.38      | 8.33    | 0.00      | 17.71  | 5              | 34.76     | 3.74    | 0.00      | 38.50  |
| 6              | 16.35     | 1.81    | 1.38      | 19.54  | 6              | 9.41      | 0.20    | 0.41      | 10.02  |
| 7              | 10.42     | 1.48    | 4.78      | 16.68  | 7              | 1.58      | 0.00    | 0.47      | 2.05   |
| 8              | 11.73     | 0.04    | 6.86      | 18.63  | 8              | 0.27      | 0.00    | 0.00      | 0.27   |
| 9              | 5.20      | 0.10    | 6.73      | 12.03  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.29      | 0.00    | 4.04      | 6.33   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.31      | 0.00    | 1.05      | 1.36   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.38      | 0.00    | 0.08      | 0.46   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 62.32     | 12.78   | 24.92     | 100.02 | TOTAL          | 91.08     | 8.05    | 0.88      | 100.01 |

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.09      | 0.00    | 0.00      | 0.09   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 4.87      | 0.85    | 0.00      | 5.72   | 4              | 39.02     | 3.44    | 0.00      | 42.45  |
| 5              | 8.14      | 7.49    | 0.00      | 15.62  | 5              | 37.36     | 3.91    | 0.00      | 41.27  |
| 6              | 15.22     | 1.77    | 1.67      | 18.66  | 6              | 12.08     | 0.25    | 0.48      | 12.81  |
| 7              | 10.25     | 1.43    | 5.70      | 17.38  | 7              | 2.36      | 0.00    | 0.65      | 3.00   |
| 8              | 11.55     | 0.04    | 8.19      | 19.77  | 8              | 0.46      | 0.00    | 0.00      | 0.46   |
| 9              | 5.18      | 0.09    | 8.04      | 13.32  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.33      | 0.00    | 5.05      | 7.39   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.32      | 0.00    | 1.26      | 1.57   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.38      | 0.00    | 0.10      | 0.49   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 58.32     | 11.67   | 30.01     | 100.00 | TOTAL          | 91.28     | 7.60    | 1.12      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,260 ppm C total)

TABLE 8. NEW YORK, NEW YORK, MOBIL UNLEADED REGULAR

| CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |       |        | CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |       |      |        |
|----------------------------------------------|-------|------|-------|--------|----------------------------------------------|-------|-------|------|--------|
| VOLUME PERCENT                               |       |      |       |        | VOLUME PERCENT                               |       |       |      |        |
| 1                                            | 0.00  | 0.00 | 0.00  | 0.00   | 1                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 2                                            | 0.00  | 0.00 | 0.00  | 0.00   | 2                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 3                                            | 0.12  | 0.00 | 0.00  | 0.12   | 3                                            | 1.40  | 0.00  | 0.00 | 1.40   |
| 4                                            | 6.07  | 1.41 | 0.00  | 7.48   | 4                                            | 45.44 | 5.98  | 0.00 | 51.42  |
| 5                                            | 13.52 | 3.06 | 0.00  | 16.58  | 5                                            | 32.23 | 4.98  | 0.00 | 37.21  |
| 6                                            | 10.72 | 2.29 | 0.81  | 13.82  | 6                                            | 6.46  | 0.53  | 0.35 | 7.34   |
| 7                                            | 10.07 | 1.24 | 6.67  | 17.98  | 7                                            | 1.46  | 0.03  | 0.61 | 2.10   |
| 8                                            | 12.84 | 0.04 | 10.45 | 23.33  | 8                                            | 0.49  | 0.00  | 0.04 | 0.53   |
| 9                                            | 4.00  | 0.15 | 9.26  | 13.41  | 9                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 10                                           | 1.60  | 0.00 | 4.82  | 6.42   | 10                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| 11                                           | 0.26  | 0.00 | 0.44  | 0.70   | 11                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| 12                                           | 0.07  | 0.00 | 0.10  | 0.17   | 12                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| TOTAL                                        | 59.27 | 8.19 | 32.55 | 100.01 | TOTAL                                        | 87.48 | 11.52 | 1.00 | 100.00 |

  

| CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |       |        | CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |       |      |        |
|----------------------------------------------|-------|------|-------|--------|----------------------------------------------|-------|-------|------|--------|
| WEIGHT PERCENT                               |       |      |       |        | WEIGHT PERCENT                               |       |       |      |        |
| 1                                            | 0.00  | 0.00 | 0.00  | 0.00   | 1                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 2                                            | 0.00  | 0.00 | 0.00  | 0.00   | 2                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 3                                            | 0.08  | 0.00 | 0.00  | 0.08   | 3                                            | 0.93  | 0.00  | 0.00 | 0.93   |
| 4                                            | 4.76  | 1.17 | 0.00  | 5.93   | 4                                            | 39.97 | 5.08  | 0.00 | 45.05  |
| 5                                            | 11.50 | 2.73 | 0.00  | 14.24  | 5                                            | 35.19 | 5.29  | 0.00 | 40.48  |
| 6                                            | 9.80  | 2.20 | 0.97  | 12.97  | 6                                            | 8.43  | 0.68  | 0.41 | 9.51   |
| 7                                            | 9.52  | 1.18 | 7.85  | 18.55  | 7                                            | 2.21  | 0.04  | 0.85 | 3.11   |
| 8                                            | 12.48 | 0.04 | 12.31 | 24.83  | 8                                            | 0.85  | 0.00  | 0.06 | 0.91   |
| 9                                            | 3.90  | 0.15 | 10.93 | 14.98  | 9                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 10                                           | 1.61  | 0.00 | 5.85  | 7.45   | 10                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| 11                                           | 0.26  | 0.00 | 0.52  | 0.78   | 11                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| 12                                           | 0.07  | 0.00 | 0.12  | 0.19   | 12                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| TOTAL                                        | 53.99 | 7.46 | 38.55 | 100.00 | TOTAL                                        | 87.59 | 11.09 | 1.33 | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,410 ppm C total)

# BEST DOCUMENT AVAILABLE

TABLE 9. NEW YORK, NEW YORK, MOBIL UNLEADED PREMIUM

| CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |       |       | CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |      |        |
|----------------------------------------------|-------|------|-------|-------|----------------------------------------------|-------|------|------|--------|
| VOLUME PERCENT                               |       |      |       |       | VOLUME PERCENT                               |       |      |      |        |
| 1                                            | 0.00  | 0.00 | 0.00  | 0.00  | 1                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 2                                            | 0.00  | 0.00 | 0.00  | 0.00  | 2                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 3                                            | 0.09  | 0.00 | 0.00  | 0.09  | 3                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 4                                            | 3.04  | 0.44 | 0.00  | 3.48  | 4                                            | 22.40 | 1.47 | 0.00 | 23.87  |
| 5                                            | 28.35 | 0.87 | 0.00  | 29.22 | 5                                            | 69.24 | 1.07 | 0.00 | 70.31  |
| 6                                            | 5.99  | 0.69 | 1.15  | 7.83  | 6                                            | 3.48  | 0.00 | 0.29 | 3.77   |
| 7                                            | 4.43  | 0.24 | 13.69 | 18.36 | 7                                            | 0.42  | 0.00 | 1.20 | 1.62   |
| 8                                            | 8.25  | 0.01 | 8.72  | 16.98 | 8                                            | 0.32  | 0.00 | 0.12 | 0.44   |
| 9                                            | 9.85  | 0.07 | 9.51  | 19.43 | 9                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 10                                           | 0.56  | 0.00 | 3.58  | 4.14  | 10                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 11                                           | 0.03  | 0.00 | 0.15  | 0.18  | 11                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 12                                           | 0.27  | 0.00 | 0.00  | 0.27  | 12                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| TOTAL                                        | 60.86 | 2.32 | 36.80 | 99.98 | TOTAL                                        | 95.86 | 2.54 | 1.61 | 100.01 |

  

| CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |       |        | CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |      |        |
|----------------------------------------------|-------|------|-------|--------|----------------------------------------------|-------|------|------|--------|
| WEIGHT PERCENT                               |       |      |       |        | WEIGHT PERCENT                               |       |      |      |        |
| 1                                            | 0.00  | 0.00 | 0.00  | 0.00   | 1                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 2                                            | 0.00  | 0.00 | 0.00  | 0.00   | 2                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 3                                            | 0.07  | 0.00 | 0.00  | 0.07   | 3                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 4                                            | 2.38  | 0.37 | 0.00  | 2.74   | 4                                            | 18.65 | 1.18 | 0.00 | 19.83  |
| 5                                            | 23.87 | 0.78 | 0.00  | 24.65  | 5                                            | 71.57 | 1.08 | 0.00 | 72.65  |
| 6                                            | 5.43  | 0.66 | 1.37  | 7.45   | 6                                            | 4.30  | 0.00 | 0.32 | 4.62   |
| 7                                            | 4.28  | 0.23 | 16.06 | 20.57  | 7                                            | 0.60  | 0.00 | 1.59 | 2.19   |
| 8                                            | 7.95  | 0.01 | 10.28 | 18.24  | 8                                            | 0.52  | 0.00 | 0.18 | 0.71   |
| 9                                            | 9.72  | 0.07 | 11.17 | 20.95  | 9                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 10                                           | 0.56  | 0.00 | 4.26  | 4.83   | 10                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 11                                           | 0.03  | 0.00 | 0.18  | 0.21   | 11                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 12                                           | 0.27  | 0.00 | 0.00  | 0.27   | 12                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| TOTAL                                        | 54.56 | 2.12 | 43.32 | 100.00 | TOTAL                                        | 95.65 | 2.26 | 2.09 | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,540 ppm C total)

# BEST DOCUMENT AVAILABLE

TABLE 10. PHILADELPHIA, PENNSYLVANIA, ARCO LEADED REGULAR

CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL

VOLUME PERCENT

|    |       |      |      |                   |
|----|-------|------|------|-------------------|
| 1  | 0.00  | 0.00 | 0.00 | 0.00              |
| 2  | 0.00  | 0.00 | 0.00 | 0.92 <sup>A</sup> |
| 3  | 0.08  | 0.00 | 0.00 | 0.08              |
| 4  | 7.85  | 0.02 | 0.00 | 7.87              |
| 5  | 17.87 | 0.03 | 0.00 | 17.90             |
| 6  | 19.69 | 0.02 | 2.17 | 21.88             |
| 7  | 12.94 | 0.05 | 6.46 | 19.45             |
| 8  | 8.52  | 0.00 | 7.03 | 15.55             |
| 9  | 3.76  | 0.03 | 5.91 | 9.70              |
| 10 | 1.90  | 0.00 | 4.03 | 5.93              |
| 11 | 0.32  | 0.00 | 0.23 | 0.55              |
| 12 | 0.11  | 0.00 | 0.06 | 0.17              |

TOTAL 73.04 0.15 25.89 100.00  
 OXYGENATE COMPOUND WITH A CARBON #= 2 FOUND @ 0.92 %

CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL

WEIGHT PERCENT

|    |       |      |      |                   |
|----|-------|------|------|-------------------|
| 1  | 0.00  | 0.00 | 0.00 | 0.00              |
| 2  | 0.00  | 0.00 | 0.00 | 1.00 <sup>A</sup> |
| 3  | 0.05  | 0.00 | 0.00 | 0.05              |
| 4  | 6.28  | 0.01 | 0.00 | 6.29              |
| 5  | 15.61 | 0.02 | 0.00 | 15.63             |
| 6  | 18.51 | 0.02 | 2.65 | 21.18             |
| 7  | 12.50 | 0.05 | 7.78 | 20.33             |
| 8  | 8.39  | 0.00 | 8.47 | 16.85             |
| 9  | 3.77  | 0.03 | 7.13 | 10.93             |
| 10 | 1.95  | 0.00 | 4.99 | 6.94              |
| 11 | 0.33  | 0.00 | 0.28 | 0.61              |
| 12 | 0.11  | 0.00 | 0.07 | 0.18              |

<sup>A</sup> TOTAL 67.50 0.14 31.36 100.00  
 OXYGENATE COMPOUND WITH A CARBON #= 2 FOUND @ 1.00 %

BULK LIQUID

CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL

VOLUME PERCENT

|    |       |      |      |       |
|----|-------|------|------|-------|
| 1  | 0.00  | 0.00 | 0.00 | 0.00  |
| 2  | 0.00  | 0.00 | 0.00 | 0.00  |
| 3  | 0.00  | 0.00 | 0.00 | 0.00  |
| 4  | 50.90 | 0.00 | 0.00 | 50.90 |
| 5  | 35.89 | 0.00 | 0.00 | 35.89 |
| 6  | 9.78  | 0.00 | 0.90 | 10.68 |
| 7  | 1.67  | 0.00 | 0.66 | 2.33  |
| 8  | 0.14  | 0.00 | 0.06 | 0.20  |
| 9  | 0.00  | 0.00 | 0.00 | 0.00  |
| 10 | 0.00  | 0.00 | 0.00 | 0.00  |
| 11 | 0.00  | 0.00 | 0.00 | 0.00  |
| 12 | 0.00  | 0.00 | 0.00 | 0.00  |

TOTAL 98.38 0.00 1.62 100.00

CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL

WEIGHT PERCENT

|    |       |      |      |       |
|----|-------|------|------|-------|
| 1  | 0.00  | 0.00 | 0.00 | 0.00  |
| 2  | 0.00  | 0.00 | 0.00 | 0.00  |
| 3  | 0.00  | 0.00 | 0.00 | 0.00  |
| 4  | 44.08 | 0.00 | 0.00 | 44.08 |
| 5  | 38.58 | 0.00 | 0.00 | 38.58 |
| 6  | 12.56 | 0.00 | 1.05 | 13.61 |
| 7  | 2.49  | 0.00 | 0.91 | 3.40  |
| 8  | 0.24  | 0.00 | 0.09 | 0.33  |
| 9  | 0.00  | 0.00 | 0.00 | 0.00  |
| 10 | 0.00  | 0.00 | 0.00 | 0.00  |
| 11 | 0.00  | 0.00 | 0.00 | 0.00  |
| 12 | 0.00  | 0.00 | 0.00 | 0.00  |

TOTAL 97.95 0.00 2.05 100.00

SATURATED VAPOR @ 80 DEGREES F.  
 (3,700 ppm C total)

TABLE 11. PHILADELPHIA, PENNSYLVANIA, EXXON LEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |        | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.14      | 0.00    | 0.00      | 0.14   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 5.94      | 1.06    | 0.00      | 7.00   | 4              | 41.02     | 4.32    | 0.00      | 45.34  |
| 5              | 17.21     | 3.13    | 0.00      | 20.34  | 5              | 38.80     | 3.18    | 0.00      | 41.98  |
| 6              | 17.36     | 2.91    | 1.08      | 21.35  | 6              | 10.38     | 0.64    | 0.39      | 11.41  |
| 7              | 8.81      | 1.92    | 4.07      | 14.80  | 7              | 0.59      | 0.30    | 0.32      | 1.21   |
| 8              | 8.23      | 0.06    | 5.96      | 14.25  | 8              | 0.06      | 0.00    | 0.00      | 0.06   |
| 9              | 4.90      | 0.08    | 7.82      | 12.80  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.41      | 0.00    | 5.17      | 7.58   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.32      | 0.00    | 0.67      | 0.99   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.59      | 0.00    | 0.16      | 0.75   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 65.91     | 9.16    | 24.93     | 100.00 | TOTAL          | 90.85     | 8.44    | 0.71      | 100.00 |

  

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.10      | 0.00    | 0.00      | 0.10   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 4.74      | 0.89    | 0.00      | 5.63   | 4              | 35.31     | 3.59    | 0.00      | 38.90  |
| 5              | 15.00     | 2.89    | 0.00      | 17.89  | 5              | 41.46     | 3.30    | 0.00      | 44.76  |
| 6              | 16.21     | 2.85    | 1.32      | 20.39  | 6              | 13.25     | 0.80    | 0.45      | 14.50  |
| 7              | 8.57      | 1.88    | 4.90      | 15.34  | 7              | 0.88      | 0.44    | 0.44      | 1.75   |
| 8              | 8.21      | 0.06    | 7.17      | 15.44  | 8              | 0.10      | 0.00    | 0.00      | 0.10   |
| 9              | 4.90      | 0.08    | 9.41      | 14.40  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.46      | 0.00    | 6.44      | 8.90   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.32      | 0.00    | 0.80      | 1.12   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.61      | 0.00    | 0.19      | 0.80   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 61.12     | 8.65    | 30.23     | 100.00 | TOTAL          | 90.98     | 8.13    | 0.89      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,320 ppm C total)

BEST DOCUMENT AVAILABLE

TABLE 11a. PHILADELPHIA, PENNSYLVANIA, EXXON LEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |        | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.88      | 0.00    | 0.00      | 0.88   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 43.87     | 4.19    | 0.00      | 48.06  | 4              | 41.02     | 4.32    | 0.00      | 45.34  |
| 5              | 35.41     | 4.08    | 0.00      | 39.49  | 5              | 38.80     | 3.18    | 0.00      | 41.98  |
| 6              | 9.84      | 0.27    | 0.19      | 10.30  | 6              | 10.38     | 0.64    | 0.39      | 11.41  |
| 7              | 0.86      | 0.00    | 0.37      | 1.23   | 7              | 0.59      | 0.30    | 0.32      | 1.21   |
| 8              | 0.04      | 0.00    | 0.00      | 0.04   | 8              | 0.06      | 0.00    | 0.00      | 0.06   |
| 9              | 0.00      | 0.00    | 0.00      | 0.00   | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.00      | 0.00    | 0.00      | 0.00   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.00      | 0.00    | 0.00      | 0.00   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.00      | 0.00   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 90.90     | 8.54    | 0.56      | 100.00 | TOTAL          | 90.85     | 8.44    | 0.71      | 100.00 |

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.58      | 0.00    | 0.00      | 0.58   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 38.20     | 3.52    | 0.00      | 41.72  | 4              | 35.31     | 3.59    | 0.00      | 38.90  |
| 5              | 38.27     | 4.29    | 0.00      | 42.56  | 5              | 41.46     | 3.30    | 0.00      | 44.76  |
| 6              | 12.70     | 0.34    | 0.22      | 13.27  | 6              | 13.25     | 0.80    | 0.45      | 14.50  |
| 7              | 1.29      | 0.00    | 0.51      | 1.80   | 7              | 0.88      | 0.44    | 0.44      | 1.75   |
| 8              | 0.07      | 0.00    | 0.00      | 0.07   | 8              | 0.10      | 0.00    | 0.00      | 0.10   |
| 9              | 0.00      | 0.00    | 0.00      | 0.00   | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.00      | 0.00    | 0.00      | 0.00   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.00      | 0.00    | 0.00      | 0.00   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.00      | 0.00   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 91.12     | 8.15    | 0.73      | 100.00 | TOTAL          | 90.98     | 8.13    | 0.89      | 100.00 |

SATURATED VAPOR @ 60 DEGREES F.  
( 970 ppm C total)

SATURATED VAPOR @ 80 DEGREES F.  
(1,320 ppm C total)

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|-------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |       | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00  | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00  | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.00      | 0.00    | 0.00      | 0.00  | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 40.30     | 4.25    | 0.00      | 44.55 | 4              | 38.47     | 4.10    | 0.00      | 42.57  |
| 5              | 39.03     | 3.59    | 0.00      | 42.62 | 5              | 39.24     | 4.74    | 0.00      | 43.98  |
| 6              | 10.37     | 1.01    | 0.41      | 11.79 | 6              | 10.81     | 1.08    | 0.40      | 12.29  |
| 7              | 0.76      | 0.00    | 0.22      | 0.98  | 7              | 0.84      | 0.00    | 0.27      | 1.11   |
| 8              | 0.05      | 0.00    | 0.00      | 0.05  | 8              | 0.05      | 0.00    | 0.00      | 0.05   |
| 9              | 0.00      | 0.00    | 0.00      | 0.00  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.00      | 0.00    | 0.00      | 0.00  | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.00      | 0.00    | 0.00      | 0.00  | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.00      | 0.00  | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 90.51     | 8.85    | 0.63      | 99.99 | TOTAL          | 89.41     | 9.92    | 0.67      | 100.00 |

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.00      | 0.00    | 0.00      | 0.00   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 34.64     | 3.53    | 0.00      | 38.17  | 4              | 32.89     | 3.38    | 0.00      | 36.27  |
| 5              | 41.65     | 3.72    | 0.00      | 45.37  | 5              | 41.65     | 4.89    | 0.00      | 46.54  |
| 6              | 13.22     | 1.26    | 0.47      | 14.95  | 6              | 13.70     | 1.34    | 0.46      | 15.50  |
| 7              | 1.13      | 0.00    | 0.30      | 1.43   | 7              | 1.24      | 0.00    | 0.37      | 1.60   |
| 8              | 0.08      | 0.00    | 0.00      | 0.08   | 8              | 0.08      | 0.00    | 0.00      | 0.08   |
| 9              | 0.00      | 0.00    | 0.00      | 0.00   | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.00      | 0.00    | 0.00      | 0.00   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.00      | 0.00    | 0.00      | 0.00   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.00      | 0.00   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 90.72     | 8.51    | 0.77      | 100.00 | TOTAL          | 89.56     | 9.61    | 0.83      | 100.00 |

SATURATED VAPOR @ 100 DEGREES F.  
(1,550 ppm C total)

SATURATED VAPOR @ 120 DEGREES F.  
(2,130 ppm C total)

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TABLE 12. PHILADELPHIA, PENNSYLVANIA, ARCO UNLEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|-------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |       | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00  | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00  | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.04      | 0.00    | 0.00      | 0.04  | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 7.32      | 0.03    | 0.00      | 7.35  | 4              | 48.79     | 0.00    | 0.00      | 48.79  |
| 5              | 17.63     | 0.09    | 0.00      | 17.72 | 5              | 39.91     | 0.00    | 0.00      | 39.91  |
| 6              | 16.45     | 0.01    | 1.82      | 18.28 | 6              | 8.85      | 0.00    | 0.63      | 9.48   |
| 7              | 9.69      | 0.01    | 7.61      | 17.31 | 7              | 1.06      | 0.00    | 0.63      | 1.69   |
| 8              | 4.58      | 0.00    | 13.48     | 18.06 | 8              | 0.03      | 0.00    | 0.11      | 0.14   |
| 9              | 1.55      | 0.00    | 12.03     | 13.58 | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.87      | 0.00    | 5.83      | 6.70  | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.21      | 0.00    | 0.43      | 0.64  | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.14      | 0.00    | 0.16      | 0.30  | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 58.48     | 0.14    | 41.36     | 99.98 | TOTAL          | 98.64     | 0.00    | 1.37      | 100.01 |

  

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.03      | 0.00    | 0.00      | 0.03   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 5.64      | 0.03    | 0.00      | 5.67   | 4              | 42.28     | 0.00    | 0.00      | 42.28  |
| 5              | 14.78     | 0.08    | 0.00      | 14.86  | 5              | 42.94     | 0.00    | 0.00      | 42.94  |
| 6              | 14.94     | 0.01    | 2.14      | 17.09  | 6              | 11.37     | 0.00    | 0.73      | 12.11  |
| 7              | 9.02      | 0.01    | 8.85      | 17.88  | 7              | 1.58      | 0.00    | 0.87      | 2.45   |
| 8              | 4.35      | 0.00    | 15.69     | 20.04  | 8              | 0.05      | 0.00    | 0.17      | 0.23   |
| 9              | 1.50      | 0.00    | 14.02     | 15.51  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.85      | 0.00    | 7.03      | 7.88   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.20      | 0.00    | 0.49      | 0.69   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.15      | 0.00    | 0.19      | 0.34   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 51.45     | 0.13    | 48.41     | 100.00 | TOTAL          | 98.23     | 0.00    | 1.77      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,210 ppm C total)

TABLE 13. PHILADELPHIA, PENNSYLVANIA, EXXON UNLEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |        | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.04      | 0.00    | 0.00      | 0.04   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 4.38      | 0.87    | 0.00      | 5.25   | 4              | 34.47     | 3.96    | 0.00      | 38.43  |
| 5              | 12.94     | 8.79    | 0.00      | 21.73  | 5              | 49.25     | 2.81    | 0.00      | 52.06  |
| 6              | 9.53      | 2.40    | 1.52      | 13.45  | 6              | 6.39      | 0.47    | 0.66      | 7.52   |
| 7              | 5.60      | 1.05    | 8.81      | 15.46  | 7              | 0.60      | 0.00    | 0.74      | 1.34   |
| 8              | 13.55     | 0.05    | 6.61      | 20.21  | 8              | 0.65      | 0.00    | 0.00      | 0.65   |
| 9              | 3.66      | 0.06    | 12.13     | 15.85  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 1.40      | 0.00    | 5.97      | 7.37   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.18      | 0.00    | 0.36      | 0.54   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.10      | 0.10   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 51.28     | 13.22   | 35.50     | 100.00 | TOTAL          | 91.36     | 7.24    | 1.40      | 100.00 |

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.03      | 0.00    | 0.00      | 0.03   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 3.41      | 0.71    | 0.00      | 4.13   | 4              | 29.37     | 3.26    | 0.00      | 32.63  |
| 5              | 10.91     | 7.75    | 0.00      | 18.66  | 5              | 52.10     | 2.89    | 0.00      | 54.99  |
| 6              | 8.65      | 2.29    | 1.80      | 12.75  | 6              | 8.07      | 0.58    | 0.76      | 9.41   |
| 7              | 5.29      | 1.00    | 10.30     | 16.59  | 7              | 0.88      | 0.00    | 1.00      | 1.88   |
| 8              | 12.96     | 0.05    | 7.73      | 20.73  | 8              | 1.09      | 0.00    | 0.00      | 1.09   |
| 9              | 3.55      | 0.05    | 14.22     | 17.82  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 1.39      | 0.00    | 7.18      | 8.56   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.18      | 0.00    | 0.42      | 0.61   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.12      | 0.12   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 46.38     | 11.86   | 41.76     | 100.00 | TOTAL          | 91.52     | 6.73    | 1.76      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,240 ppm C total)

TABLE 13a. PHILADELPHIA, PENNSYLVANIA, EXXON UNLEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |        | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.00      | 0.00    | 0.00      | 0.00   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 35.54     | 4.04    | 0.00      | 39.58  | 4              | 34.47     | 3.96    | 0.00      | 38.43  |
| 5              | 47.64     | 2.72    | 0.00      | 50.36  | 5              | 49.25     | 2.81    | 0.00      | 52.06  |
| 6              | 4.36      | 2.51    | 0.15      | 7.02   | 6              | 6.39      | 0.47    | 0.66      | 7.52   |
| 7              | 1.45      | 0.00    | 0.16      | 1.61   | 7              | 0.60      | 0.00    | 0.74      | 1.34   |
| 8              | 1.34      | 0.00    | 0.10      | 1.44   | 8              | 0.65      | 0.00    | 0.00      | 0.65   |
| 9              | 0.00      | 0.00    | 0.00      | 0.00   | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.00      | 0.00    | 0.00      | 0.00   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.00      | 0.00    | 0.00      | 0.00   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.00      | 0.00   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 90.33     | 9.27    | 0.41      | 100.01 | TOTAL          | 91.36     | 7.24    | 1.40      | 100.00 |

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.00      | 0.00    | 0.00      | 0.00   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 30.19     | 3.31    | 0.00      | 33.50  | 4              | 29.37     | 3.26    | 0.00      | 32.63  |
| 5              | 50.23     | 2.79    | 0.00      | 53.02  | 5              | 52.10     | 2.89    | 0.00      | 54.99  |
| 6              | 5.49      | 3.09    | 0.17      | 8.75   | 6              | 8.07      | 0.58    | 0.76      | 9.41   |
| 7              | 2.12      | 0.00    | 0.22      | 2.34   | 7              | 0.88      | 0.00    | 1.00      | 1.88   |
| 8              | 2.24      | 0.00    | 0.16      | 2.39   | 8              | 1.09      | 0.00    | 0.00      | 1.09   |
| 9              | 0.00      | 0.00    | 0.00      | 0.00   | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.00      | 0.00    | 0.00      | 0.00   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.00      | 0.00    | 0.00      | 0.00   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.00      | 0.00   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 90.27     | 9.19    | 0.54      | 100.00 | TOTAL          | 91.52     | 6.73    | 1.76      | 100.00 |

SATURATED VAPOR @ 60 DEGREES F.  
(880 ppm C total)

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL |
|----------------|-----------|---------|-----------|-------|
| VOLUME PERCENT |           |         |           |       |
| 1              | 0.00      | 0.00    | 0.00      | 0.00  |
| 2              | 0.00      | 0.00    | 0.00      | 0.00  |
| 3              | 0.00      | 0.00    | 0.00      | 0.00  |
| 4              | 32.65     | 3.82    | 0.00      | 36.47 |
| 5              | 49.79     | 3.35    | 0.00      | 53.14 |
| 6              | 6.44      | 1.01    | 0.74      | 8.19  |
| 7              | 0.65      | 0.54    | 0.80      | 1.99  |
| 8              | 0.20      | 0.00    | 0.00      | 0.20  |
| 9              | 0.00      | 0.00    | 0.00      | 0.00  |
| 10             | 0.00      | 0.00    | 0.00      | 0.00  |
| 11             | 0.00      | 0.00    | 0.00      | 0.00  |
| 12             | 0.00      | 0.00    | 0.00      | 0.00  |
| TOTAL          | 89.73     | 8.72    | 1.54      | 99.99 |

SATURATED VAPOR @ 80 DEGREES F.  
(1,240 ppm C total)

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 31.02     | 3.56    | 0.00      | 34.58  |
| 5              | 51.26     | 3.90    | 0.00      | 55.16  |
| 6              | 6.53      | 1.04    | 0.58      | 8.15   |
| 7              | 0.74      | 0.51    | 0.70      | 1.95   |
| 8              | 0.17      | 0.00    | 0.00      | 0.17   |
| 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 89.72     | 9.01    | 1.28      | 100.01 |

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 27.69     | 3.13    | 0.00      | 30.82  |
| 5              | 52.43     | 3.43    | 0.00      | 55.86  |
| 6              | 8.10      | 1.24    | 0.84      | 10.18  |
| 7              | 0.95      | 0.77    | 1.08      | 2.80   |
| 8              | 0.33      | 0.00    | 0.00      | 0.33   |
| 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 89.51     | 8.57    | 1.92      | 100.00 |

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 26.21     | 2.90    | 0.00      | 29.12  |
| 5              | 53.77     | 3.98    | 0.00      | 57.74  |
| 6              | 8.10      | 1.27    | 0.66      | 10.11  |
| 7              | 1.08      | 0.73    | 0.94      | 2.74   |
| 8              | 0.28      | 0.00    | 0.00      | 0.28   |
| 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 89.52     | 8.88    | 1.60      | 100.00 |

SATURATED VAPOR @ 100 DEGREES F.  
(1,440 ppm C total)SATURATED VAPOR @ 120 DEGREES F.  
(1,990 ppm C total)

TABLE 14. PHILADELPHIA, PENNSYLVANIA, SUNOCO UNLEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|-------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |       | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00  | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00  | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.12      | 0.00    | 0.00      | 0.12  | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 6.72      | 0.69    | 0.00      | 7.41  | 4              | 52.15     | 2.84    | 0.00      | 54.99  |
| 5              | 11.78     | 2.28    | 0.00      | 14.06 | 5              | 31.58     | 2.88    | 0.00      | 34.46  |
| 6              | 8.72      | 2.51    | 0.34      | 11.57 | 6              | 6.88      | 0.17    | 0.18      | 7.23   |
| 7              | 7.91      | 0.74    | 4.66      | 13.31 | 7              | 1.25      | 0.00    | 0.56      | 1.81   |
| 8              | 20.77     | 0.02    | 8.52      | 29.31 | 8              | 1.37      | 0.00    | 0.14      | 1.51   |
| 9              | 5.03      | 0.14    | 8.71      | 13.88 | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.15      | 0.00    | 5.89      | 8.04  | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.82      | 0.00    | 0.76      | 1.58  | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.52      | 0.00    | 0.18      | 0.70  | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 64.54     | 6.38    | 29.06     | 99.98 | TOTAL          | 93.23     | 5.89    | 0.88      | 100.00 |

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.08      | 0.00    | 0.00      | 0.08   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 5.29      | 0.57    | 0.00      | 5.86   | 4              | 45.64     | 2.40    | 0.00      | 48.04  |
| 5              | 10.05     | 2.05    | 0.00      | 12.10  | 5              | 34.31     | 3.04    | 0.00      | 37.35  |
| 6              | 8.00      | 2.37    | 0.41      | 10.78  | 6              | 8.93      | 0.22    | 0.21      | 9.36   |
| 7              | 7.51      | 0.71    | 5.51      | 13.73  | 7              | 1.89      | 0.00    | 0.78      | 2.66   |
| 8              | 20.09     | 0.02    | 10.07     | 30.19  | 8              | 2.36      | 0.00    | 0.22      | 2.58   |
| 9              | 4.94      | 0.14    | 10.31     | 15.39  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.16      | 0.00    | 7.22      | 9.39   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.83      | 0.00    | 0.89      | 1.72   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.54      | 0.00    | 0.22      | 0.75   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 59.48     | 5.88    | 34.64     | 100.00 | TOTAL          | 93.13     | 5.66    | 1.21      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES

(1,010 ppm C total)

BEST DOCUMENT AVAILABLE

TABLE 15. PHILADELPHIA, PENNSYLVANIA, AMOCO UNLEADED PREMIUM

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|-------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |       | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00  | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00  | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.06      | 0.00    | 0.00      | 0.06  | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 4.66      | 1.43    | 0.00      | 6.09  | 4              | 39.28     | 6.59    | 0.00      | 45.87  |
| 5              | 11.47     | 5.92    | 0.00      | 17.39 | 5              | 35.43     | 6.17    | 0.00      | 41.60  |
| 6              | 7.47      | 3.69    | 0.97      | 12.13 | 6              | 5.72      | 2.91    | 0.28      | 8.91   |
| 7              | 4.64      | 1.47    | 16.90     | 23.01 | 7              | 0.73      | 0.04    | 2.00      | 2.77   |
| 8              | 9.96      | 0.03    | 9.95      | 19.94 | 8              | 0.75      | 0.00    | 0.10      | 0.85   |
| 9              | 2.91      | 0.02    | 10.69     | 13.62 | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 1.01      | 0.00    | 6.08      | 7.09  | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.22      | 0.00    | 0.30      | 0.52  | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.08      | 0.00    | 0.06      | 0.14  | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 42.48     | 12.56   | 44.95     | 99.99 | TOTAL          | 81.91     | 15.71   | 2.38      | 100.00 |

  

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.04      | 0.00    | 0.00      | 0.04   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 3.54      | 1.14    | 0.00      | 4.68   | 4              | 33.77     | 5.47    | 0.00      | 39.25  |
| 5              | 9.44      | 5.14    | 0.00      | 14.58  | 5              | 37.82     | 6.40    | 0.00      | 44.22  |
| 6              | 6.66      | 3.42    | 1.12      | 11.20  | 6              | 7.29      | 3.62    | 0.32      | 11.24  |
| 7              | 4.33      | 1.36    | 19.29     | 24.97  | 7              | 1.08      | 0.06    | 2.73      | 3.87   |
| 8              | 9.30      | 0.02    | 11.35     | 20.68  | 8              | 1.27      | 0.00    | 0.16      | 1.42   |
| 9              | 2.75      | 0.01    | 12.23     | 14.99  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 0.98      | 0.00    | 7.17      | 8.15   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.22      | 0.00    | 0.35      | 0.56   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.07      | 0.00    | 0.07      | 0.14   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 37.33     | 11.10   | 51.58     | 100.00 | TOTAL          | 81.24     | 15.56   | 3.21      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,040 ppm C total)

TABLE 16. BALTIMORE, MARYLAND, EXXON LEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |        | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.09      | 0.00    | 0.00      | 0.09   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 4.92      | 1.18    | 0.00      | 6.10   | 4              | 36.45     | 5.27    | 0.00      | 41.72  |
| 5              | 17.48     | 3.21    | 0.00      | 20.69  | 5              | 40.40     | 4.83    | 0.00      | 45.23  |
| 6              | 16.42     | 2.91    | 1.12      | 20.45  | 6              | 10.16     | 0.96    | 0.25      | 11.37  |
| 7              | 9.41      | 1.56    | 4.37      | 15.34  | 7              | 1.20      | 0.04    | 0.41      | 1.65   |
| 8              | 8.28      | 0.07    | 5.94      | 14.29  | 8              | 0.04      | 0.00    | 0.00      | 0.04   |
| 9              | 4.55      | 0.07    | 9.58      | 14.20  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 1.89      | 0.00    | 5.59      | 7.48   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.28      | 0.00    | 0.51      | 0.79   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.51      | 0.00    | 0.06      | 0.57   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 63.83     | 9.00    | 27.17     | 100.00 | TOTAL          | 88.25     | 11.10   | 0.66      | 100.01 |

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.07      | 0.00    | 0.00      | 0.07   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 3.91      | 0.99    | 0.00      | 4.91   | 4              | 31.11     | 4.34    | 0.00      | 35.45  |
| 5              | 15.16     | 2.94    | 0.00      | 18.10  | 5              | 42.80     | 4.97    | 0.00      | 47.78  |
| 6              | 15.22     | 2.84    | 1.35      | 19.40  | 6              | 12.86     | 1.19    | 0.29      | 14.33  |
| 7              | 9.07      | 1.52    | 5.21      | 15.80  | 7              | 1.77      | 0.06    | 0.56      | 2.38   |
| 8              | 8.19      | 0.06    | 7.10      | 15.35  | 8              | 0.07      | 0.00    | 0.00      | 0.07   |
| 9              | 4.53      | 0.07    | 11.47     | 16.07  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 1.92      | 0.00    | 6.89      | 8.81   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.29      | 0.00    | 0.60      | 0.89   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.53      | 0.00    | 0.07      | 0.60   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 58.88     | 8.41    | 32.71     | 100.00 | TOTAL          | 88.60     | 10.56   | 0.84      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,170 ppm C total)

TABLE 17. BALTIMORE, MARYLAND, EXXON UNLEADED REGULAR

| CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |       |        | CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |      |        |
|----------------------------------------------|-------|------|-------|--------|----------------------------------------------|-------|------|------|--------|
| VOLUME PERCENT                               |       |      |       |        | VOLUME PERCENT                               |       |      |      |        |
| 1                                            | 0.00  | 0.00 | 0.00  | 0.00   | 1                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 2                                            | 0.00  | 0.00 | 0.00  | 0.00   | 2                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 3                                            | 0.04  | 0.00 | 0.00  | 0.04   | 3                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 4                                            | 4.17  | 0.67 | 0.00  | 4.84   | 4                                            | 34.41 | 3.32 | 0.00 | 37.73  |
| 5                                            | 18.40 | 2.65 | 0.00  | 21.05  | 5                                            | 49.82 | 3.31 | 0.00 | 53.13  |
| 6                                            | 9.49  | 2.55 | 1.60  | 13.64  | 6                                            | 5.71  | 0.59 | 0.74 | 7.04   |
| 7                                            | 5.77  | 1.11 | 7.22  | 14.10  | 7                                            | 0.62  | 0.00 | 0.69 | 1.31   |
| 8                                            | 15.37 | 0.06 | 6.64  | 22.07  | 8                                            | 0.79  | 0.00 | 0.00 | 0.79   |
| 9                                            | 3.58  | 0.06 | 12.42 | 16.06  | 9                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 10                                           | 1.29  | 0.00 | 6.26  | 7.55   | 10                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 11                                           | 0.18  | 0.00 | 0.37  | 0.55   | 11                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 12                                           | 0.00  | 0.00 | 0.10  | 0.10   | 12                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| TOTAL                                        | 58.29 | 7.10 | 34.61 | 100.00 | TOTAL                                        | 91.35 | 7.22 | 1.43 | 100.00 |

  

| CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |       |        | CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |      |      |        |
|----------------------------------------------|-------|------|-------|--------|----------------------------------------------|-------|------|------|--------|
| WEIGHT PERCENT                               |       |      |       |        | WEIGHT PERCENT                               |       |      |      |        |
| 1                                            | 0.00  | 0.00 | 0.00  | 0.00   | 1                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 2                                            | 0.00  | 0.00 | 0.00  | 0.00   | 2                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 3                                            | 0.02  | 0.00 | 0.00  | 0.02   | 3                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 4                                            | 3.26  | 0.55 | 0.00  | 3.81   | 4                                            | 29.29 | 2.73 | 0.00 | 32.02  |
| 5                                            | 15.57 | 2.38 | 0.00  | 17.94  | 5                                            | 52.64 | 3.40 | 0.00 | 56.04  |
| 6                                            | 8.65  | 2.44 | 1.90  | 12.99  | 6                                            | 7.21  | 0.73 | 0.85 | 8.78   |
| 7                                            | 5.46  | 1.06 | 8.46  | 14.98  | 7                                            | 0.91  | 0.00 | 0.93 | 1.84   |
| 8                                            | 14.72 | 0.06 | 7.78  | 22.56  | 8                                            | 1.32  | 0.00 | 0.00 | 1.32   |
| 9                                            | 3.48  | 0.05 | 14.59 | 18.12  | 9                                            | 0.00  | 0.00 | 0.00 | 0.00   |
| 10                                           | 1.28  | 0.00 | 7.55  | 8.83   | 10                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 11                                           | 0.18  | 0.00 | 0.44  | 0.62   | 11                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| 12                                           | 0.00  | 0.00 | 0.12  | 0.12   | 12                                           | 0.00  | 0.00 | 0.00 | 0.00   |
| TOTAL                                        | 52.63 | 6.55 | 40.83 | 100.00 | TOTAL                                        | 91.37 | 6.86 | 1.78 | 100.00 |

BULK LIQUID

**BEST DOCUMENT AVAILABLE**SATURATED VAPOR @ 80 DEGREES F.  
(1,150 ppm C total)

TABLE 18. BALTIMORE, MARYLAND, SHELL UNLEADED PREMIUM

| CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |       |       |        | CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |       |      |        |
|----------------------------------------------|-------|-------|-------|--------|----------------------------------------------|-------|-------|------|--------|
| VOLUME PERCENT                               |       |       |       |        | VOLUME PERCENT                               |       |       |      |        |
| 1                                            | 0.00  | 0.00  | 0.00  | 0.00   | 1                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 2                                            | 0.00  | 0.00  | 0.00  | 0.00   | 2                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 3                                            | 0.07  | 0.00  | 0.00  | 0.07   | 3                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 4                                            | 5.30  | 2.30  | 0.00  | 7.60   | 4                                            | 38.57 | 15.38 | 0.00 | 53.95  |
| 5                                            | 12.03 | 8.22  | 0.00  | 20.25  | 5                                            | 31.79 | 5.59  | 0.00 | 37.38  |
| 6                                            | 7.19  | 1.96  | 0.54  | 9.69   | 6                                            | 4.57  | 2.03  | 0.00 | 6.60   |
| 7                                            | 5.78  | 0.65  | 16.15 | 22.58  | 7                                            | 0.32  | 0.00  | 1.28 | 1.60   |
| 8                                            | 13.57 | 0.02  | 8.67  | 22.26  | 8                                            | 0.47  | 0.00  | 0.00 | 0.47   |
| 9                                            | 3.58  | 0.14  | 7.40  | 11.12  | 9                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 10                                           | 1.39  | 0.00  | 4.13  | 5.52   | 10                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| 11                                           | 0.18  | 0.00  | 0.38  | 0.56   | 11                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| 12                                           | 0.35  | 0.00  | 0.00  | 0.35   | 12                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| TOTAL                                        | 49.44 | 13.29 | 37.27 | 100.00 | TOTAL                                        | 75.72 | 23.00 | 1.28 | 100.00 |

  

| CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |       |       |        | CARBON NO. PARAFFINS OLEFINS AROMATICS TOTAL |       |       |      |        |
|----------------------------------------------|-------|-------|-------|--------|----------------------------------------------|-------|-------|------|--------|
| WEIGHT PERCENT                               |       |       |       |        | WEIGHT PERCENT                               |       |       |      |        |
| 1                                            | 0.00  | 0.00  | 0.00  | 0.00   | 1                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 2                                            | 0.00  | 0.00  | 0.00  | 0.00   | 2                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 3                                            | 0.04  | 0.00  | 0.00  | 0.04   | 3                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 4                                            | 4.09  | 1.88  | 0.00  | 5.98   | 4                                            | 34.18 | 13.16 | 0.00 | 47.34  |
| 5                                            | 10.17 | 7.29  | 0.00  | 17.46  | 5                                            | 34.97 | 5.98  | 0.00 | 40.95  |
| 6                                            | 6.52  | 1.83  | 0.63  | 8.98   | 6                                            | 6.00  | 2.61  | 0.00 | 8.61   |
| 7                                            | 5.44  | 0.62  | 18.83 | 24.89  | 7                                            | 0.49  | 0.00  | 1.80 | 2.29   |
| 8                                            | 12.97 | 0.01  | 10.11 | 23.09  | 8                                            | 0.82  | 0.00  | 0.00 | 0.82   |
| 9                                            | 3.47  | 0.14  | 8.68  | 12.29  | 9                                            | 0.00  | 0.00  | 0.00 | 0.00   |
| 10                                           | 1.39  | 0.00  | 4.93  | 6.31   | 10                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| 11                                           | 0.17  | 0.00  | 0.43  | 0.60   | 11                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| 12                                           | 0.35  | 0.00  | 0.00  | 0.35   | 12                                           | 0.00  | 0.00  | 0.00 | 0.00   |
| TOTAL                                        | 44.61 | 11.76 | 43.62 | 100.00 | TOTAL                                        | 76.46 | 21.74 | 1.80 | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,400 ppm C total)

BEST DOCUMENT AVAILABLE.

TABLE 19. WASHINGTON, D.C., AMOCO LEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|-------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |       | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00  | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00  | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.11      | 0.00    | 0.00      | 0.11  | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 6.58      | 0.96    | 0.00      | 7.54  | 4              | 46.29     | 3.79    | 0.00      | 50.08  |
| 5              | 14.72     | 2.79    | 0.00      | 17.51 | 5              | 33.03     | 3.84    | 0.00      | 36.87  |
| 6              | 16.46     | 1.96    | 1.44      | 19.86 | 6              | 9.72      | 0.41    | 0.37      | 10.50  |
| 7              | 11.33     | 0.86    | 5.08      | 17.27 | 7              | 1.74      | 0.00    | 0.51      | 2.25   |
| 8              | 10.99     | 0.04    | 6.74      | 17.77 | 8              | 0.27      | 0.00    | 0.03      | 0.30   |
| 9              | 4.44      | 0.11    | 6.93      | 11.48 | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.17      | 0.00    | 4.77      | 6.94  | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.37      | 0.00    | 0.57      | 0.94  | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.42      | 0.00    | 0.15      | 0.57  | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 67.59     | 6.72    | 25.68     | 99.99 | TOTAL          | 91.05     | 8.04    | 0.91      | 100.00 |

  

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.07      | 0.00    | 0.00      | 0.07   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 5.24      | 0.81    | 0.00      | 6.05   | 4              | 40.08     | 3.17    | 0.00      | 43.25  |
| 5              | 12.76     | 2.55    | 0.00      | 15.31  | 5              | 35.50     | 4.01    | 0.00      | 39.52  |
| 6              | 15.37     | 1.91    | 1.74      | 19.03  | 6              | 12.48     | 0.51    | 0.43      | 13.42  |
| 7              | 11.17     | 0.83    | 6.06      | 18.07  | 7              | 2.60      | 0.00    | 0.70      | 3.30   |
| 8              | 10.78     | 0.04    | 8.05      | 18.86  | 8              | 0.46      | 0.00    | 0.05      | 0.51   |
| 9              | 4.40      | 0.11    | 8.30      | 12.81  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.21      | 0.00    | 5.92      | 8.14   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.39      | 0.00    | 0.67      | 1.05   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.44      | 0.00    | 0.17      | 0.61   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 62.83     | 6.25    | 30.92     | 100.00 | TOTAL          | 91.13     | 7.70    | 1.18      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,370 ppm C total)

TABLE 20. WASHINGTON, D.C., AMOCO UNLEADED REGULAR

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|-------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |       | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00  | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00  | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.07      | 0.00    | 0.00      | 0.07  | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 6.17      | 0.92    | 0.00      | 7.09  | 4              | 45.01     | 3.63    | 0.00      | 48.64  |
| 5              | 14.82     | 3.47    | 0.00      | 18.29 | 5              | 35.91     | 4.44    | 0.00      | 40.35  |
| 6              | 10.75     | 1.80    | 0.64      | 13.19 | 6              | 6.98      | 0.94    | 0.25      | 8.17   |
| 7              | 9.39      | 0.95    | 6.71      | 17.05 | 7              | 1.32      | 0.00    | 0.70      | 2.02   |
| 8              | 13.29     | 0.04    | 7.69      | 21.02 | 8              | 0.74      | 0.00    | 0.08      | 0.82   |
| 9              | 3.77      | 0.04    | 8.25      | 12.06 | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.46      | 0.00    | 5.46      | 7.92  | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 1.38      | 0.00    | 0.64      | 2.02  | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.54      | 0.00    | 0.14      | 0.68  | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 63.24     | 7.22    | 29.53     | 99.99 | TOTAL          | 89.96     | 9.01    | 1.03      | 100.00 |

  

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.05      | 0.00    | 0.00      | 0.05   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 4.87      | 0.77    | 0.00      | 5.64   | 4              | 38.97     | 3.03    | 0.00      | 42.01  |
| 5              | 12.71     | 3.13    | 0.00      | 15.85  | 5              | 38.60     | 4.64    | 0.00      | 43.24  |
| 6              | 9.87      | 1.78    | 0.77      | 12.41  | 6              | 8.96      | 1.18    | 0.29      | 10.43  |
| 7              | 8.93      | 0.92    | 7.94      | 17.79  | 7              | 1.97      | 0.00    | 0.96      | 2.93   |
| 8              | 13.45     | 0.04    | 9.11      | 22.60  | 8              | 1.26      | 0.00    | 0.13      | 1.39   |
| 9              | 3.70      | 0.04    | 9.81      | 13.56  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 2.48      | 0.00    | 6.74      | 9.22   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 1.40      | 0.00    | 0.76      | 2.16   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.55      | 0.00    | 0.17      | 0.73   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 58.02     | 6.67    | 35.31     | 100.00 | TOTAL          | 89.77     | 8.85    | 1.38      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,450 ppm C total)

TABLE 21. WASHINGTON, D.C., AMOCO UNLEADED PREMIUM

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| VOLUME PERCENT |           |         |           |        | VOLUME PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.06      | 0.00    | 0.00      | 0.06   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 4.99      | 1.44    | 0.00      | 6.43   | 4              | 42.39     | 6.84    | 0.00      | 49.23  |
| 5              | 10.58     | 5.85    | 0.00      | 16.43  | 5              | 33.33     | 5.70    | 0.00      | 39.03  |
| 6              | 7.05      | 3.92    | 1.02      | 11.99  | 6              | 5.35      | 3.19    | 0.28      | 8.82   |
| 7              | 4.61      | 1.64    | 15.12     | 21.37  | 7              | 0.69      | 0.00    | 1.47      | 2.16   |
| 8              | 10.99     | 0.04    | 11.33     | 22.36  | 8              | 0.70      | 0.00    | 0.07      | 0.77   |
| 9              | 3.62      | 0.03    | 10.16     | 13.81  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 1.15      | 0.00    | 5.68      | 6.83   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.22      | 0.00    | 0.30      | 0.52   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.14      | 0.00    | 0.06      | 0.20   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 43.41     | 12.92   | 43.67     | 100.00 | TOTAL          | 82.46     | 15.73   | 1.82      | 100.01 |

  

| CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  | CARBON NO.     | PARAFFINS | OLEFINS | AROMATICS | TOTAL  |
|----------------|-----------|---------|-----------|--------|----------------|-----------|---------|-----------|--------|
| WEIGHT PERCENT |           |         |           |        | WEIGHT PERCENT |           |         |           |        |
| 1              | 0.00      | 0.00    | 0.00      | 0.00   | 1              | 0.00      | 0.00    | 0.00      | 0.00   |
| 2              | 0.00      | 0.00    | 0.00      | 0.00   | 2              | 0.00      | 0.00    | 0.00      | 0.00   |
| 3              | 0.04      | 0.00    | 0.00      | 0.04   | 3              | 0.00      | 0.00    | 0.00      | 0.00   |
| 4              | 3.80      | 1.15    | 0.00      | 4.95   | 4              | 36.80     | 5.73    | 0.00      | 42.53  |
| 5              | 8.73      | 5.09    | 0.00      | 13.82  | 5              | 35.91     | 5.97    | 0.00      | 41.89  |
| 6              | 6.29      | 3.64    | 1.19      | 11.12  | 6              | 6.89      | 4.01    | 0.33      | 11.22  |
| 7              | 4.31      | 1.53    | 17.28     | 23.11  | 7              | 1.03      | 0.00    | 2.02      | 3.06   |
| 8              | 10.29     | 0.04    | 12.96     | 23.29  | 8              | 1.19      | 0.00    | 0.11      | 1.31   |
| 9              | 3.43      | 0.03    | 11.64     | 15.09  | 9              | 0.00      | 0.00    | 0.00      | 0.00   |
| 10             | 1.13      | 0.00    | 6.70      | 7.82   | 10             | 0.00      | 0.00    | 0.00      | 0.00   |
| 11             | 0.21      | 0.00    | 0.33      | 0.54   | 11             | 0.00      | 0.00    | 0.00      | 0.00   |
| 12             | 0.14      | 0.00    | 0.07      | 0.21   | 12             | 0.00      | 0.00    | 0.00      | 0.00   |
| TOTAL          | 38.38     | 11.47   | 50.16     | 100.00 | TOTAL          | 81.82     | 15.71   | 2.46      | 100.00 |

BULK LIQUID

SATURATED VAPOR @ 80 DEGREES F.  
(1,200 ppm C total)

TABLE 22. WEIGHTING FACTORS (MOLECULAR WEIGHTS) USED IN CALCULATIONS

CARBON NO. PARAFFINS OLEFINS AROMATICS OXYGENATES ACETYLENES

|    | MOLECULAR WEIGHTS |         |           |            |            |
|----|-------------------|---------|-----------|------------|------------|
|    | PARAFFINS         | OLEFINS | AROMATICS | OXYGENATES | ACETYLENES |
| 1  | 16                | 0       | 0         | 32         | 0          |
| 2  | 30                | 28      | 0         | 44         | 26         |
| 3  | 44                | 42      | 0         | 60         | 40         |
| 4  | 58                | 56      | 0         | 74         | 54         |
| 5  | 72                | 70      | 0         | 88         | 68         |
| 6  | 86                | 84      | 78        | 102        | 82         |
| 7  | 100               | 98      | 92        | 116        | 96         |
| 8  | 114               | 112     | 106       | 130        | 110        |
| 9  | 128               | 126     | 120       | 144        | 124        |
| 10 | 142               | 140     | 134       | 158        | 138        |
| 11 | 156               | 154     | 148       | 172        | 152        |
| 12 | 170               | 168     | 162       | 186        | 166        |

BEST DOCUMENT AVAILABLE

| TECHNICAL REPORT DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------|
| (Please read Instructions on the reverse before completing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |                                       |
| 1. REPORT NO.<br>EPA-450/4-80-036a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2.                                               | 3. RECIPIENT'S ACCESSION NO.          |
| 4. TITLE AND SUBTITLE<br>Northeast Corridor Regional Modeling Project - Determination of Organic Species Profiles for Gasoline Liquids and Vapors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                  | 5. REPORT DATE<br>December 1980       |
| 7. AUTHOR(S)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  | 6. PERFORMING ORGANIZATION CODE       |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS<br>Midwest Research Institute<br>425 Volker Boulevard<br>Kansas City, Missouri 64110                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  | 8. PERFORMING ORGANIZATION REPORT NO. |
| 12. SPONSORING AGENCY NAME AND ADDRESS<br>EPA, Office of Air Quality Planning and Standards<br>Monitoring and Data Analysis Division (MD-14)<br>Research Triangle Park, North Carolina 27711                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  | 10. PROGRAM ELEMENT NO.               |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  | 14. SPONSORING AGENCY CODE            |
| 15. SUPPLEMENTARY NOTES<br><br>EPA Project Officer: Thomas N. Braverman                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |                                       |
| 16. ABSTRACT<br>Midwest Research Institute collected gasoline samples from five northeast cities in July 1980 and delivered the samples to the Department of Energy, Bartlesville, OK where gas chromatography analysis was performed to determine both liquid and vapor species profiles for each sample.<br><br>The purposes of this study were (1) to determine organic species profiles for gasoline vapors for use in photochemical modeling applications, (2) to compare organic species profiles for gasoline vapors to organic species profiles of gasoline liquids, and (3) to determine the effect of temperature on gasoline vapor speciation. |                                                  |                                       |
| 17. KEY WORDS AND DOCUMENT ANALYSIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                  |                                       |
| a. DESCRIPTORS<br>Gasoline Vapor - Organic Species Profiles<br>Gasoline Liquid - Organic Species Profiles<br>Photochemical Model Input<br>Volatile Organic Compound Species Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | b. IDENTIFIERS/OPEN ENDED TERMS                  | c. COSATI Field/Group                 |
| 18. DISTRIBUTION STATEMENT<br>UNLIMITED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 19. SECURITY CLASS (This Report)<br>UNCLASSIFIED | 21. NO. OF PAGES<br>34                |
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